IN THE CLAIMS

Claims 1-23. (Canceled)

24. (Previously Presented Currently Amended) A method including the steps of

comprising: forming a transition metal oxide having a phase therein which

exhibits a superconducting state at a critical temperature in excess of greater

than or equal to 26°K,

maintaining the temperature of said material at a temperature less than said

critical temperature to produce said superconducting state in said phase, and

passing an electrical supercurrent through said transition metal oxide while it is in

said superconducting state[[.]], and

said composition comprising at least one element selected from the group

consisting of a first element group, a second element group and combinations

thereof, wherein said first element group comprises rare earth elements, rare

earth-like elements and Group IIIB elements and said second element group

comprises alkaline earth elements and Group IIA elements.

25. (Original) The method of claim 24, where said transition metal oxide is

comprised of a transition metal capable of exhibiting multivalent states.

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26. (Original) The method of claim 24, where said transition metal oxide is comprised of a Cu oxide.

Claims 27-85. (Canceled)

26°K,

86. (<u>Previously PresentedCurrently Amended</u>) A method, comprising: the steps of:

forming a composition including a transition metal, a rare earth or rare earth-like element, an alkaline earth element, and oxygen, where said composition is a mixed transition metal oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K, and

passing an electrical current through said composition while said composition is in said superconducting state.

87. (Original) The method of claim 86, where said transition metal is copper.

88. (<u>Previously PresentedCurrently Amended</u>) A method, including the steps of comprising:

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forming a composition exhibiting a superconductive state at a temperature in

excess of 26°K, maintaining said composition at a temperature in excess of

greater than or equal to 26°K at which temperature said composition exhibits

said superconductive state,-and

passing an electrical current through said composition while said composition

is in said superconductive state[[.]],\_and

said composition comprising a transition metal, oxygen and at least one element

selected from the group consisting of a first element group, a second element

group and combinations thereof, wherein said first element group comprises rare

earth elements, rare earth-like elements and Group IIIB elements and said

second element group comprises alkaline earth elements and Group IIA

elements.

89. (Previously Presented Currently Amended) The method of claim 88, where

said composition is comprised of a metal-copper oxide.

90. (Original) The metal of claim 88, where said composition is comprised of a

transition metal oxide.

Claims 91-95. (Canceled)

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96. (<u>Previously PresentedCurrently Amended</u>) A superconductive method for causing electric current flow in a superconductive state at a temperature in excess of greater than or equal to 26 K, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of comprising a copper-exide compound having a layer-type perovskite-like crystal structure, the composition having a superconductor transition temperature T<sub>c</sub> of greater than 26 K;

- (b) maintaining the superconductor element at a temperature above- greater than or equal to 26 K and below the superconductor transition temperature  $T_c$  of the superconductive composition; and
- (c) causing an electric current to flow in the superconductor element[[.]] and
- (d) said composition comprising a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

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97. (<u>Previously Presented</u>Currently-Amended) The superconductive method according to claim 96 in which the compound of the superconductive composition includes comprises at least one rare-earth or rare-earth-like element and at least one alkaline-earth element.

98. (Previously Presented) The superconductive method according to claim 97 in which the rare-earth or rare-earth-like element is lanthanum.

99. (Previously Presented) The superconductive method according to claim 97 in which the alkaline-earth element is barium.

100. (<u>Previously PresentedCurrently Amended</u>) The superconductive method according to claim 96 in which the sepper-exide-compound of the superconductive composition includes mixed valent sepper-transition metal ions.

101. (<u>Previously Presented Currently Amended</u>) The superconductive method according to claim 100 in which the copper-oxide compound includes comprises at least one element in a nonstoichiometric atomic proportion.

102. (<u>Previously PresentedCurrently Amended</u>) The superconductive method according to claim 101 in which oxygen is present in the <del>copper-oxide</del> compound in a nonstoichiometric atomic proportion.

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103. (Previously Presented) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

- (a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of comprising a copper-exide compound having a layer-type perovskite-like crystal structure, the copper-exide compound including at least one rare earth or rare earth like element and at least one alkaline earth element the composition comprising a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements..., the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_p=0$ , the transition-onset temperature  $T_c$  being greater than 26 K;
- (b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and

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(c) causing an electric current to flow in the superconductor element.

104. (Previously Presented) The superconductive method according to claim 103

in which the rare-earth or rare-earth-like element is lanthanum.

105. (Previously Presented) The superconductive method according to claim 103

in which the alkaline-earth element is barium.

106. (Previously Presented Currently Amended) The superconductive method

according to claim 103 in which the copper-oxide compound of the

superconductive composition includes mixed valent copper ions.

107. (Previously Presented) The superconductive method according to claim 106

in which the copper-oxide-compound is a the copper-oxide includes-comprising

at least one element in a nonstoichiometric atomic proportion.

108. (Previously Presented) The superconductive method according to claim 107

in which oxygen is present in the copper-oxide compound in a nonstoichiometric

atomic proportion.

109. (Previously Presented Currently Amended) A method including the steps of

comprising:

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forming copper oxide having a phase therein which exhibits a superconducting state at a critical temperature in excess of greater than or equal to 26°K; maintaining the temperature of said material at a temperature less than said critical temperature to produce said superconducting state in said phase;

passing an electrical supercurrent through said copper oxide while it is in said superconducting state;

said copper oxide includes at least one element selected from the group consisting of a Group II A element, a rare earth element and a Group III B element, at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

110. (<u>Previously PresentedCurrently Amended</u>) A method comprising the steps of:

forming a composition including copper, oxygen and an element selected from the group consisting of a Group II A element, a rare earth element, a rare-earth-like element, an alkaline earth element and a Group III B element, where said composition is a mixed copper oxide having a non-stoichiometric amount of

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oxygen therein and exhibiting a superconducting state at a temperature greater

than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature

greater than or equal to 26°K; and

passing an electrical current through said composition while said composition is

in said superconducting state.

111. (Previously Presented Currently Amended) A method including the steps of

comprising:

forming a composition exhibiting a superconductive state at a temperature in

excess of greater than or equal to 26°K;

maintaining said composition at a temperature in excess of greater than or equal

to 26°K at which temperature said composition exhibits said superconductive

state;

passing an electrical current through said composition while said composition is

in said superconductive state; and

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said composition including a copper oxide and an element selected from the

group consisting of Group II A element, a rare earth element a rare earth like

element, an alkaline earth element and a Group III B element.

112. (Currently Amended Currently Amended) A superconductive method for

causing electric-current flow in a superconductive state at a temperature in

excess of greater than or equal to 26°K, comprising:

(a) providing a superconductor element made of a superconductive composition,

the superconductive composition comprising consisting essentially of a copper-

oxide compound having a layer-type perovskite-like crystal structure, the

composition having a superconductive transition temperature T<sub>c</sub> of greater than

or equal to 26°K, said superconductive composition includes at least one element

selected from the group consisting of a Group II A element, a rare earth element,

a rare earth like element; an alkaline earth element, a Group IIA element and a

Group III B element;

(b) maintaining the superconductor element at a temperature above 26°K and

below the superconductor transition temperature T<sub>c</sub> of the superconductive

composition; and

(c) causing an electric current to flow in the superconductor element.

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113. (<u>Previously Presented</u>Currently Amended) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of comprising a copper-oxide compound having a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a Group II A element, a rare earth element, a rare earth like element, an alkaline earth element , a Group IIA element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to  $26^{\circ}$ K;

- (b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=o}$  of the superconductive composition; and
- (c) causing an electric current to flow in the superconductor element.
- 114. (<u>Previously Presented</u>Currently Amended) A method including the steps of comprising:

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forming copper oxide having a phase therein which exhibits a superconducting state at a critical temperature in excess of greater than or equal to 26°K;

maintaining the temperature of said material at a temperature less than said critical temperature to produce said superconducting state in said phase;

passing an electrical supercurrent through said copper oxide while it is in said superconducting state;

said copper oxide includes at least one element selected from the group consisting of a Group II A element and at least one element selected from the group consisting of a rare earth element, a rare earth like element, an alkaline earth element, a Group IIA element and a Group III B element.

115. (<u>Previously PresentedCurrently Amended</u>) A method comprising the steps of:

forming a composition including copper, oxygen and an element selected from the group consisting of at least one Group II A element and at least one element selected from the group consisting of a rare earth element, a rare earth like element, an alkaline earth element and a Group III B element, where said composition is a mixed copper oxide having a non-stoichiometric amount of

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oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than 26°K; and

passing an electrical current through said composition while said composition is in said superconducting state.

116. (Previously Presented Currently Amended) A method including the steps of:

forming a composition exhibiting a superconductive state at a temperature in excess of greater than or equal to 26°K;

maintaining said composition at a temperature excess of greater than or equal to 26°K at which temperature said composition exhibits said superconductive state;

passing an electrical current through said composition while said composition is in said superconductive state; and

said composition including a copper oxide and at least one element selected from the group consisting of Group II A-and at least one element selected from

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the group consisting of, a rare earth element, a rare earth like element, and an alkaline earth element and a Group III B element.

117. (<u>Currently Amended</u>) A superconductive method for causing electric-current flow in a superconductive state at a temperature in excess of greater than or equal to 26°K, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition-consisting-essentially of comprising U a copper-oxide compound having a layer-type perovskite-like crystal structure, the composition having a superconductive transition temperature T<sub>c</sub> of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element-and at least one element selected from the group consisting of, a rare earth element, a rare earth like element, and alkaline earth element and a Group III B element;

(b) maintaining the superconductor element at a temperature -above  $26^{\circ}$ K and below the superconductor transition temperature  $T_c$  of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

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118. (Currently Amended) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of-comprises a copper-oxide compound having a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a Group II A element, and at least one element selected from the group-consisting of a rare earth element, a rare earth like element, an alkaline earth element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive-resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept\_-temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to  $26^{\circ}$ K;

- (b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) causing an electric current to flow in the superconductor element.
- 119. (Currently Amended) A method including the steps of comprising:

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forming a transition metal oxide having a phase therein which exhibits a superconducting state at a critical temperature in excess of 26°K;

maintaining the temperature of said material at a temperature less than said critical temperature to produce said superconducting state in said phase;

passing an electrical supercurrent-superconducting current through said-copper transition metal oxide while it is in said superconducting state;

said transitional metal oxide includes at least one element selected from the group consisting of a Group II A element and at lest one element selected from the group consisting of, a rare earth element, a rare earth like element element, an alkaline earth element and a Group III B element.

120. (Currently Amended) A method comprising the steps of:

forming a composition including a transition metal, oxygen and an element selected from the group consisting of at least one Group II A element, and at least one element selected from the group consisting of a rare earth element, a rare earth like element, an alkaline earth element and a Group III B element, where said composition is a mixed transitional metal oxide formed from said transition metal and said oxygen, said mixed transition metal oxide having a non-

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stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

passing an electrical current through said composition while said composition is in said superconducting state.

121. (Currently Amended) A method including the steps of comprising:

forming a composition exhibiting a superconductive state at a temperature in excess of or equal to 26°K;

maintaining said composition at a temperature in excess of greater than or equal to 26°K at which temperature said composition exhibits said superconductive state;

passing an electrical current through said composition while said composition is in said superconductive state; and

said composition including a transitional metal oxide and at least one element selected from the group consisting of Group II A, element and at least one

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element selected from the group consisting of a rare earth element, a rare earth element, an alkaline earth element and a Group III B element.

122. (<u>Previously Presented</u>Currently Amended) A superconductive method for causing electric-current flow in a superconductive state at a temperature in excess of 26°K, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of comprising a transition metal oxide compound having a layer-type perovskite-like crystal structure, the composition having a superconductive transition temperature T<sub>c</sub> of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element-and-at least one element selected from the group-consisting of-, a rare earth element, a rare earth like element, an alkaline earth element and a Group III B element;

(b) maintaining the superconductor element at a temperature above-greater than or equal to  $26^{\circ}$ K and below the superconductor transition  $T_c$  of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

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123. (<u>Previously Presented Currently Amended</u>) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition eensisting essentially of comprising a transition metal-oxide compound having a layer-type perovskite-like crystal structure, the transition metal-oxide compound including at least one element selected from the group consisting of a Group II A element-and at least one element selected from the group consisting of, a rare earth element, a rare earth like element, an alkaline earth element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature T<sub>c</sub> and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature T<sub>p=0</sub>, the transition-onset temperature T<sub>c</sub> being greater than or equal to 26°K;

- (b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) causing an electric current to flow in the superconductor element.

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124. (<u>Previously Presented</u>Currently Amended) A method including the steps of comprising:

forming copper oxide having a phase therein which exhibits a superconducting state at a critical temperature in excess of greater than or equal to 26°K;

maintaining the temperature of said material at a temperature less than said critical temperature to produce said superconducting state in said phase;

passing an electrical supercurrent through said copper oxide while it is in said superconducting state;

said copper oxide includes at least one element selected from group consisting of a Group II A element, at least one element selected from the group consisting of \_a rare earth element, a rare earth like element, an alkaline earth element and at least one element selected from the group consisting of a Group III B element.

125. (<u>Previously PresentedCurrently Amended</u>) A method comprising the steps of:

forming a composition-including comprising copper, oxygen and an element selected from the group consisting of at least one Group II A element, and at least one element selected from the group consisting of a rare earth element or

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rare earth like element, at least one alkaline earth element and at least one element selected from the group consisting of a Group III B element, where said composition is a mixed copper oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

passing an electrical current through said composition while said composition is in said superconducting state.

126. (Previously Presented Currently Amended) A method including the steps of comprising:

forming a composition exhibiting a superconductive state at a temperature in excess of greater than or equal to 26°K;

maintaining said composition at a temperature in excess of greater than of equal to 26°K at which temperature said composition exhibits said superconductive state;

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passing an electrical current through said composition while said composition is in said superconductive state; and

said composition including comprising a copper oxide and at least one element selected from the group consisting of Group II A element, at least one element selected from the group consisting of , a rare earth element, a rare earth like element, and alkaline earth element and at least one element selected from the group consisting of a Group III B element.

127. (<u>Previously PresentedCurrently Amended</u>) A superconductive method for causing electric-current flow in a superconductive state at a temperature in excess of greater than or equal to 26°K, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition eensisting essentially of comprising a copper-oxide compound having a layer-type perovskite-like crystal structure, the composition having a superconductive transition temperature T<sub>c</sub> of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element, at least one element selected from the group consisting of a rare earth element, a rare earth like element and at least one element selected from the group consisting of a Group III B element;

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- (b) maintaining the superconductor element at a temperature above-greater than or equal to  $26^{\circ}$ K and below the superconductor transition temperature  $T_c$  of the superconductive composition; and
- (c) causing an electric current to flow in the superconductor element.
- 128. (Currently Amended) A superconductive method for conducting an electric current essentially without resistive losses, comprising:
- (a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a layer-type perovskite-like crystal structure, the copper-oxide compound including-comprising at least one element selected from the group consisting of a group-Group II A element, at least one a rare earth element or rare earth like element element and at least one element selected from the group consisting of a Group III B element, the composition having a superconductive-resistive transition temperature defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to  $26^{\circ}$ K;

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- (b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) causing an electric current to flow in the superconductor element.
- 129. (Previously PresentedCurrently Amended) A method comprising: providing a composition having a transition temperature greater than or equal to 26°K, the composition including a rare earth or alkaline earth element comprising, a transition metal element capable of exhibiting multivalent states and oxygen, including at least one phase that exhibits superconductivity at temperature in excess of greater than or equal to 26°K, maintaining said composition at said temperature to exhibit said superconductivity and passing an electrical superconducting current through said composition with said phrase exhibiting said superconductivity and said superconducting transition metal oxide comprising at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.
- 130. (<u>Previously PresentedCurrently Amended</u>) A method comprising: providing a superconducting transition metal oxide having a superconductive onset

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transition metal oxide at a temperature less than said superconducting onset temperature,—and flowing a superconducting current therein and said superconducting transition metal oxide comprising at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

131. (<u>Previously PresentedCurrently Amended</u>) A method comprising: providing a superconducting copper oxide having a superconductive onset temperature greater than or equal to 26°K, maintaining said superconducting copper oxide at a temperature less than said superconducting onset temperature and flowing a superconducting current in said superconducting copper oxide and said superconducting copper oxide comprising at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

132. (Currently Amended) A method comprising: providing a superconducting oxide composition having a superconductive onset temperature greater than or equal to 26°K, maintaining said superconducting copper oxide at a temperature

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less than said superconducting onset temperature and flowing a superconducting current therein, said superconducting oxide composition composition comprising at least one each of rare earth element or rare earth like-, an alkaline earth element, and copper.

133. (<u>Previously PresentedCurrently Amended</u>) A method comprising: providing a superconducting copper oxide composition having a superconductive onset temperature greater than or equal to 26°K, maintaining said superconducting copper oxide at a temperature less than said superconducting onset temperature and flowing a superconducting electrical current therein, said composition comprising at least one each of a Group III B element, an alkaline earth, and copper.

134. (Previously Presented Currently Amended) A method comprising: flowing a superconducting electrical current in a transition metal oxide having a T<sub>c</sub> greater than or equal to 26°K-and, maintaining said transition metal oxide at a temperature less than said T<sub>c</sub> and said transition metal oxide comprises at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIIA elements.

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135. (<u>Previously PresentedCurrently Amended</u>) A method comprising: flowing a superconducting current in a copper oxide having a T<sub>c</sub> greater than or equal to 26°K and maintaining said copper oxide at a temperature less than said T<sub>c</sub>- and said superconducting copper oxide comprising at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

136. (<u>Previously PresentedCurrently Amended</u>) A method comprising the steps of:

forming a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>, Cu<sub>5</sub>O<sub>Y</sub>, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature in excess ef-greater than or equal to 26°K;

maintaining the temperature of said composition at a temperature less than said critical temperature to induce said superconducting state in said metal oxide phase; and

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passing an electrical current through said composition while said metal oxide phase is in said superconducting state.

137. (<u>Previously PresentedCurrently Amended</u>) A method comprising flowing a superconducting electrical current in a composition of matter having a T<sub>c</sub> greater than or equal to 26°K, said composition comprising at least one each of a III B element, an alkaline earth, and copper oxide and maintaining said composition of matter at a temperature less than or equal to said T<sub>c</sub>.

138. (<u>Previously Presented Currently Amended</u>) A method comprising flowing a superconducting electrical current in a composition of matter having a T<sub>c</sub> greater than or equal to 26°K, said composition comprising at least one each of a rare earth, alkaline earth, and copper oxide and maintaining said composition of matter at a temperature less than said T<sub>c</sub>.

139. (<u>Previously PresentedCurrently Amended</u>) A method comprising: flowing a superconducting electrical current in a composition of matter having a T<sub>c</sub> greater than or equal to 26°K, said composition comprising at least one each of a rare earth\_element or rare earth like element, and copper oxide and maintaining said composition of matter at a temperature less than said T<sub>c</sub>.

140. (<u>Previously PresentedCurrently Amended</u>) A method comprising: flowing a superconducting electrical current in a composition of matter having a T<sub>c</sub> greater than or equal to 26°K carrying, said composition comprising at least one each of

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a III B element, and copper oxide and maintaining said composition of matter at a temperature less than said  $T_{\text{c}}$ .

141. (Currently Amended) A method comprising: flowing a superconducting electrical current in a transition metal oxide comprising a T<sub>c</sub>[[>]] greater than or equal\_to 26°K, and, maintaining said transition metal oxide at a temperature less than said said T<sub>c</sub> and said transition metal oxide comprises at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

142. (<u>Previously PresentedCurrently Amended</u>) A method comprising: flowing a superconducting electrical current in a copper oxide composition of matter comprising a T<sub>c</sub>[[>]] greater than or equal to 26°K-and, maintaining said copper oxide composition of matter at a temperature less than said T<sub>c</sub> and said copper oxide composition comprises at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements.

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143. (Previously Presented Currently Amended) A method, comprising the steps

of:

forming a composition including comprising a transition metal, a group IIIB

element, an alkaline earth element, and oxygen, where said composition is a

mixed transition metal oxide having a non-stoichiometric amount of oxygen

therein and exhibiting a superconducting state at a temperature greater than or

equal to 26°K,

maintaining said composition in said superconducting state at a temperature

greater than 26°K, and

passing an electrical current through said composition while said composition is

in said superconducting state.

144. (Previously Presented) The method of claim 143, where said transition

metal is copper.

145. (Previously Presented Currently Amended) A superconductive method for

causing electric current flow in a superconductive state at a temperature in

excess of greater than or equal to 26 K, comprising:

(a) providing a superconductor element made of a superconductive composition,

the superconductive composition consisting essentially of a copper-oxide

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compound having a substantially layered perovskite crystal structure, the composition having a superconductor transition temperature T<sub>c</sub> of greater than or equal to 26 K and comprising at least one element selected from the group consisting of a first element group, a second element group and combinations thereof, wherein said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements and said second element group comprises alkaline earth elements and Group IIA elements;

b) maintaining the superconductor element at a temperature above 26 K and below the superconductor transition temperature  $T_{\rm c}$  of the superconductive composition; and

(c) causing an electric current to flow in the superconductor element.

146. (<u>Previously PresentedCurrently Amended</u>) A superconductive method for causing electric current flow in a superconductive state at a temperature in excess of greater than or equal to 26 K, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a substantially layered perovskite crystal structure, the composition having a superconductor transition temperature  $T_c$  of greater than or equal to 26 K;

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- b) maintaining the superconductor element at a temperature above 26 K and below the superconductor transition temperature  $T_c$  of the superconductive composition; and
- (c) causing an electric current to flow in the superconductor element
- (d) The superconductive method according to claim 145 in which the copperoxide compound of the superconductive composition includes at least one
  element selected from the group consisting of a rare-earth element or rare earth
  like element and a Group III B element and at least one alkaline-earth element.
- 147.(Previously Presented) The superconductive method according to claim 146 in which the rare-earth or rare-earth-like element is lanthanum.
- 148. (Previously Presented) The superconductive method according to claim 146 in which the alkaline-earth element is barium.
- 149. (Previously Presented) The superconductive method according to claim 145 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

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150. (Previously Presented) The superconductive method according to claim 149 in which the copper-oxide compound includes at least one element in a nonstoichiometric atomic proportion.

151. (Previously Presented) The superconductive method according to claim 150 in which oxygen is present in the copper-oxide compound in a nonstoichiometric atomic proportion.

152. (Currently Amended) A superconductive method for conducting an electric current essentially without resistive losses, comprising:

(a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a substantially layered perovskite crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a rare-earth element or a reare rare earth like element and a -Group III B element and at least one alkaline-earth element, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26 K;

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(b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive

(c) causing an electric current to flow in the superconductor element.

composition; and

153. (Previously Presented) The superconductive method according to claim 152 in which said at least one element is lanthanum.

154. (Previously Presented) The superconductive method according to claim 152 in which the alkaline-earth element is barium.

155. (Previously Presented) The superconductive method according to claim 152 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

156. (Previously Presented) The superconductive method according to claim 155 in which the copper-oxide compound includes at least one element in a nonstoichiometric atomic proportion.

157. (Previously Presented) The superconductive method according to claim 156 in which oxygen is present in the copper-oxide compound in a nonstoichiometric atomic proportion.

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158. (Currently Amended) A superconductive method for causing electric-current

flow

in a superconductive state at a temperature in excess of greater than or equal to

26°K, comprising:

(a) providing a superconductor element made of a superconductive composition,

the superconductive composition consisting essentially of a copper-oxide

compound having a substantially layered perovskite crystal structure, the

composition having a superconductive transition temperature T<sub>c</sub> of greater than

or equal to 26°K, said superconductive composition includes at least one element

selected from the group consisting of a Group II A element, a rare earth element,

a rare earth like element, an alkaline earth element element and a Group III B

element;

(b) maintaining the superconductor element at a temperature above 26°K and

below the superconductor transition temperature T<sub>c</sub> of the superconductive

composition; and

(c) causing an electric current to flow in the superconductor element.

159. (Currently Amended) A superconductive method for conducting an electric

current essentially without resistive losses, comprising:

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(a) providing a superconductor element made of a superconductive composition, the superconductive composition eensisting essentially of comprising a copper-oxide compound having a substantially layered perovskite crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a Group II A element, a rare earth element, a rare  $\frac{\text{arth}}{\text{earth}}$  like element, an alkaline earth element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to  $26^{\circ}$ K;

- (b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=o}$  of the superconductive composition; and
- (c) causing an electric current to flow in the superconductor element.
- 160. (<u>Previously Presented</u>Currently Amended) A superconductive method for causing electric-current flow in a superconductive state at a temperature in excess of greater than or equal to 26°K, comprising:

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- (a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a substantially layered perovskite crystal structure, the composition having a superconductive transition temperature T<sub>c</sub> of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element and at least one element selected from the group consisting of a rare earth element, a rare earth like element and a Group III B element;
- (b) maintaining the superconductor element at a temperature above 26°K and below the superconductor transition temperature T<sub>c</sub> of the superconductive composition; and
- (c) causing an electric current to flow in the superconductor element.
- 161. (<u>Previously Presented</u>Currently Amended) A superconductive method for conducting an electric current \_essentially without resistive losses, comprising:
- (a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a substantially layered perovskite crystal structure, the copper-oxide compound including at least one element selected from the group

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consisting of a Group II A element and at least one element selected from the group consisting of a rare earth element or a rare earth like element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive-resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept—temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to  $26^{\circ}$ K;

- (b) maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) causing an electric current to flow in the superconductor element.
- 162. (Currently Amended) A superconductive method for causing electric-current flow in a superconductive state at a temperature in excess of 26°K, comprising:
- (a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a transition metal oxide compound having a substantially layered perovskite crystal structure, the composition having a superconductive transition temperature T<sub>c</sub> of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element, and at least one

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element selected from the group consisting of a rare earth element, a rre rare earth like element, an alkaline arth element and a Group III B element;

- (b) maintaining the superconductor element at a temperature above 26°K and below the superconductor transition T<sub>c</sub> of the superconductive composition; and
- (c) causing an electric current to flow in the superconductor element.
- 163. (<u>Previously Presented</u>Currently Amended) A superconductive method for conducting an electric current essentially without resistive losses, comprising:
- (a) providing a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a transition metal-oxide compound having a substantially layered perovskite crystal structure, the transition metal-oxide compound including at least one element selected from each of the group consisting of a Group II A element, and at least one element selected from the group consisting of a rare earth element or rare earth like element, an alkaline earth element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature T<sub>c</sub> and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature T p=0, the transition-onset temperature T<sub>c</sub> being greater than or equal to 26°K;

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(b) maintaining the superconductor element at a temperature below the

effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive

composition; and

(c) causing an electric current to flow in the superconductor

element.

164. (Previously Presented) A method according to claim 129 wherein said

composition comprises a substantially layered perovskite crystal structure.

165. (Previously Presented) A method according to claim 130 wherein said

superconducting transistor metal oxide comprises a substantially layered

perovskite crystal structure.

166. (Previously Presented) A method according to claim 131 wherein said

superconducting copper oxide comprises a substantially layered perovskite

crystal structure.

167. (Previously Presented) A method according to claim 132 wherein said

superconducting oxide composition comprises a substantially layered perovskite

crystal structure.

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168. (Previously Presented) A method according to claim 133 wherein said superconducting oxide composition comprises a substantially layered perovskite crystal structure.

169. (Previously Presented) A method according to claim 134 wherein said transistor metal oxide comprises a substantially layered perovskite crystal structure.

170. (Previously Presented) A method according to claim 135 wherein said copper oxide comprises a substantially layered perovskite crystal structure.

171. (Previously Presented) A method according to claim 136 wherein said composition comprises a substantially layered perovskite crystal structure.

172. (Previously Presented) A method according to claim 137 wherein said composition of matter comprises a substantially layered perovskite crystal structure.

173. (Previously Presented) A method according to claim 138 wherein said composition of matter comprises substantially layered perovskite crystal structure.

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174. (Previously Presented) A method according to claim 139 wherein said

composition of matter comprises a substantially layered perovskite crystal

structure.

175. (Previously Presented) A method according to claim 140 wherein said

composition of matter comprises substantially layered perovskite crystal

structure.

176. (Previously Presented) A method according to claim 141 wherein said

transistor metal oxide comprises substantially layered perovskite crystal

structure.

177. (Previously Presented) A method according to claim 142 wherein said

copper oxide composition comprises substantially layered perovskite crystal

structure.

CLAIM-178. (NewPreviously Presented) An method comprising:

providing a composition comprising a transition metal, oxygen and any element

selected from the group consisting of a Group II A element, a rare earth element

or a rare earth like element and a Group III B element, where said composition is

a mixed transition metal oxide having a non-stoichiometric amount of oxygen

therein and exhibiting a superconducting state at a temperature greater than or

equal to 26°K;

maintaining said composition in said superconducting state at a temperature

greater than or equal to 26°K; and

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passing an electrical current through said composition while said composition is in said superconducting state.

CLAIM-179. (Previously Presented New)- An method comprising:

providing a composition comprising a transition metal, oxygen and (1) a rare earth element or a rare earth-like element or a group III B element, and/or (2) an alkaline earth element or a Group IIA element, where said composition exhibits a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

passing an electrical current through said composition while said composition is in said superconducting state.

CLAIM 180. (New Previously Presented) A method according to claim 178 wherein said transition metal is copper.

CLAIM-181. (New Previously Presented) A method according to claim 179 wherein said transition metal is copper.

CLAIM-182. (NewPreviously Presented)- A method comprising:

flowing a superconducting current through a material comprising a  $T_c$  greater than or equal to  $26^{\circ}K_{-,\dot{\tau}}$ 

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said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM-183. (NeCurrently Amendedw) A method according to claim 182 further including maintaining said material at a temperature less than or equal to said to said T<sub>C</sub> and greater than or equal to 26°K.

CLAIM-184. (NewPreviously Presented) A method according to claim 182 further including providing a source of current for said superconducting current.

CLAIM-185. (Previously PresentedNew) A method according to claim 183 further including providing a source of current for said superconducting current.

CLAIM-186. (Previously PresentedNew) A method according to claim 182 wherein said material is maintained at a temperature less than or equal to said  $T_c$  and greater than or equal to  $26^{\circ}$ K.

CLAIM-187. (NewPreviously Presented) A method according to claim 183 wherein said material is maintained at a temperature less than or equal to said  $T_c$  and greater than or equal to 26°K.

CLAIM-188. (NewPreviously Presented) A method according to claim 184 wherein said material is maintained at a temperature less than or equal to said T<sub>c</sub> and greater than or equal to 26°K.

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CLAIM-189. (Previously PresentedNew) A method according to claim 185 wherein said material is maintained at a temperature less than equal to said  $T_c$  and greater than or equal to 26°K.

CLAIM-190. (NewPreviously Presented) A method according to claim 182 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,

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```
a perovskite structure,
a substantially perovskite structure,
a perovskite-like structure,
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
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a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
a stoiciomeric oxygen content,
a non-stoiciomeric oxygen content,
a multivalent material,
a multivalent transition metal,
a transition metal element capable of exhibiting multivalent states,
a mixed valent material,
mixed valent ions,
mixed valent transition metal ions,
multivalent ions,
multivalent transition metal ions,
multivalent copper,
multivalent copper ions,
mixed valent copper,
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mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

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a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material.

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

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a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing

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said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-1591\_ (Previously PresentedNew) A method according to claim 183 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
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a stoiciomeric oxygen content,
a non-stoiciomeric oxygen content,
a multivalent material,
a multivalent transition metal,
a transition metal element capable of exhibiting multivalent states,
a mixed valent material,
mixed valent ions,
mixed valent transition metal ions,
multivalent ions,
multivalent transition metal ions,
multivalent copper,
multivalent copper ions,
mixed valent copper,
mixed valent copper ions,
a ceramic-like material in the RE-AE-TM-O system, where RE is a rare
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earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

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a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

CLAIM-192. (Previously PresentedNew) A method according to claim 184 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,

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- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,
- a perovskite type structure,
- a structure comprising a perovskite characteristic,
- a perovskite related structure,
- a crystalline structure,
- a layer-like crystalline structure,
- a structure which is structurally substantially similar to an orthorhombictetragonal phase of said material,
- a crystalline structure which enhances electron-phonon interactions to produce superconductivity,
- a structure enhancing the number of Jahn-Teller polarons in said material,
- a distorted crystalline structure characterized by an oxygen deficiency,
- a structure comprising enhanced polaron formation,
- a ceramic material,

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```
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
a stoiciomeric oxygen content,
a non-stoiciomeric oxygen content,
a multivalent material,
a multivalent transition metal,
a transition metal element capable of exhibiting multivalent states,
a mixed valent material,
mixed valent ions,
mixed valent transition metal ions,
multivalent ions,
multivalent transition metal ions,
multivalent copper,
multivalent copper ions,
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mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

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a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

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a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing

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said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-193. (Previously PresentedNew) A method according to claim 185 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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a stoiciomeric oxygen content,
a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth,

rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K.

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula BaLa<sub>5-x</sub>Cu<sub>5</sub>O<sub>5(3-y)</sub>, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-194. (Previously PresentedNew) A structure according to claim 186 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper, mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material.

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula BaLa<sub>5-x</sub>Cu<sub>5</sub>O<sub>5(3-y)</sub>, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-195. (Previously PresentedNew) A method according to claim 187 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

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a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

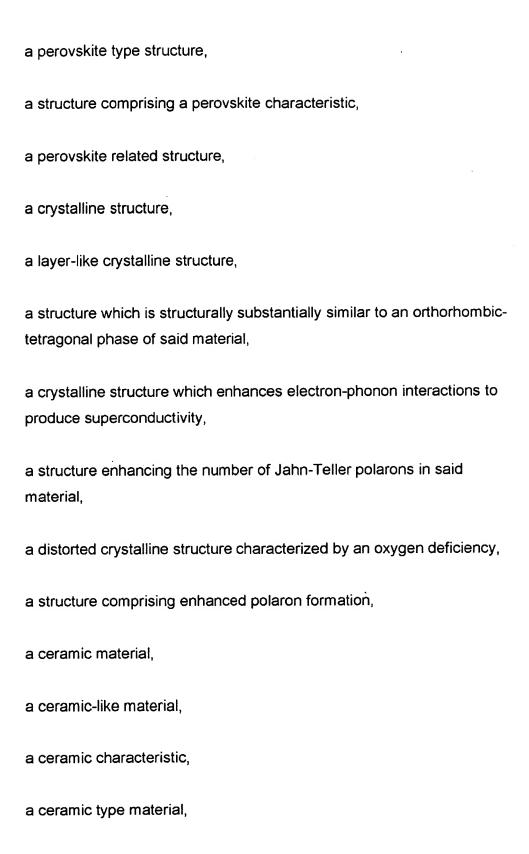
combinations thereof.

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CLAIM-196. (Previously PresentedNew) A method according to claim 188 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material.

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K.

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-197. (Previously PresentedNew) A method according to claim 189 said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper, mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare

earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

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a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-198. (Previously PresentedNew) A method according to claim 182, wherein said transition metal is selected from the group consisting of copper, nickel and chromium.

CLAIM-199. (New Currently Amended) A method according to claim 182 wherein said rare earth-like elements include elements include elements comprising a rare earth characteristic property which makes it essentially a rare earth element.

CLAIM 200. (Previously Presented New) A method according to claim 182 wherein said composition comprises one or more of Be, Mg, Ca, Sr, Ba, Ra, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

CLAIM-201. (NewPreviously Presented) A method according to claim 182 wherein said composition comprises one or more of one or more of Se, Mg, Ca, Sr, Ba and Ra and one or more of Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

CLAIM-202. (NewPreviously Presented) A method according to claim 182 wherein said material can be made according to known principles of ceramic science.

CLAIM-203. (Previously PresentedNew) A method according to claim 182 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound.

CLAIM-204. (Previously PresentedNew) A method according to claim 182 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent copper compound.

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CLAIM-205. (Previously PresentedNew) A method according to claim 182 wherein said material comprises a multiphase material wherein at least one phase exhibits superconductivity.

CLAIM-206. (NewPreviously Presented) A method according to claim 182 wherein said method is a method of operation of a structure capable of magnetic levitation.

CLAIM-207. (Previously PresentedNew) A method according to claim 182 wherein said material comprises at least one element selected from each of said first element group and said second element group.

CLAIM-208. (NewCurrently Amended) A method according to any one of claims 182 to 206 or 207 wherein said superconducting current is flowing in a structure selected from the group consisting of:

a power generation device,

an electrical power transmission device,

an electrical power transmission element,

a coil,

a magnet,

a plasma device,

a nuclear device.

a nuclear magnetic resonace resonance device,

a nuclear magnetic imaging device,

a magnetic levitation device,

a power gerneation generation system,

a thermonuclear fusion device,

a switching device.

a Josephson junction device,

an electrical packaging device,

a circuit device,

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a electronic instrumentation device,

a train,

a magnetic succeptometer susceptometer, and

a magnetometer.

CLAIM-209. (New Currently Amended) A method according to any one of claims 182 to 207<del>or 208</del> wherein said superconducting current is flowing in a coil comprised of said material.

CLAIM-210. (NewPreviously Presented) A method according to claim 209 wherein said material possesses substantially zero electrical resistance.

CLAIM-211. (New Previously Presented) A method according to claim 209 wherein said coil possesses substantially zero electrical resistance.

CLAIM-212. (Previously Presented) A method according to claim 182 where in said superconducting current is flowing in a structure selected from the group consisting of a device, an apparatus, a circuit and a combination.

CLAIM-213. (NewCurrently Amended) A method according to any one of claims 182 to 207 211 or 212 wherein said material possesses substantially zero electrical resistance.

CLAIM-214. (NewCurrently Amended) A method according to any one of claims 182 to 207er 208-wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance. between said input and said output.

CLAIM-215. (NewPreviously Presented) A method according to claim 214 wherein said material possesses substantially zero electrical resistance.

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CLAIM-216. (New Currently Amended) A method according to any one of claims 182 to 207er-208 wherein said superconducting current flows from an input of a circuit element to an output of said circuit element.

CLAIM-217. (NewPreviously Presented) A method according to claim 216 wherein said material possesses substantially zero electrical resistance.

CLAIM-218. (New Currently Amended) A method according to any one of claims 182 to 207 211er 212 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

CLAIM-219. (NewPreviously Presented) A method according to claim -218 wherein said material possesses substantially zero electrical resistance.

CLAIM-220. (New Currently Amended) A method according to any one of claims 182 to 207er 208-wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

CLAIM-221. (New Previously Presented) A method according to claim 220 wherein said material possesses substantially zero electrical resistance.

CLAIM-222. (Previously PresentedNew) A method according to claim 216 wherein said material is part of said circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

CLAIM-223. (New Previously Presented) A method according to claim 222 wherein said material possesses substantially zero electrical resistance.

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CLAIM-224. (NewCurrently Amended) A method according to any one of claims 182 to -207 or 208 wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.

CLAIM-225. (NewPreviously Presented) A method according to claim 224 wherein said material possesses substantially zero electrical resistance.

CLAIM-226. (New Previously Presented) A method according to claim 209 wherein said coil is carrying said superconducting current flowing therein without a source providing for said superconducting current.

CLAIM-227. (New Currently Amended) A structure according to any one of claims 182 to -207 or -208 wherein said superconducting current is flowing without a source providing for said superconducting current.

CLAIM-228. (Previously Presented) (New)—A method comprising:

flowing a superconducting current through a material having a  $T_c$  greater than or equal to  $26^{\circ}K_{\dot{\tau}}$ 

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

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CLAIM-229. (NewPreviously Presented) A method comprising:

flowing a superconducting current through a material with a  $T_c$  greater than or equal to  $26^\circ K_{\bar{\tau}}$ 

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and group IIA elements.

CLAIM-230. (Previously Presented New) A method comprising:

flowing a superconducting current through a material possessing a  $T_c$  greater than or equal to  $26^{\circ}K_{ii}$ 

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

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CLAIM-231. (New Currently Amended) A method according to any one of claims 182, 228, 229 or 230 wherein said rare earth-like elements include elements include elements comprising a rare earth characteristic property which makes it essentially a rare earth element.

CLAIM-232. (New Currently Amended) A method according to any one of claims 182 to 207 212, 228, 229 or 230 further including forming said material.

CLAIM-233. (Previously Presented) A method according to claim 213 further including forming said material.

CLAIM-234. (Previously PresentedNew) A method according to claim 214 further including forming said material.

CLAIM-235. (Previously PresentedNew) A method according to claim 215 further including forming said material.

CLAIM-236. (NewPreviously Presented) A method according to claim 216 further including forming said material.

CLAIM-237. (NewPreviously Presented) A method according to claim 217 further including forming said material.

CLAIM-238. (NewPreviously Presented) A method according to claim 218 further including forming said material.

CLAIM-239. (NewPreviously Presented) A method according to claim 219 further including forming said material.

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CLAIM-240. (NewPreviously Presented) A method according to claim 220 further including forming said material.

CLAIM-241. (New Previously Presented) A method according to claim 221 further including forming said- material.

CLAIM-242. (NewPreviously Presented) A method according to claim 222 further including forming said material.

CLAIM-243. (Previously PresentedNew) A method according to claim 223 further including forming said material.

CLAIM-244. (New Previously Presented) A method according to claim 224 further including forming said material.

CLAIM-245. (NewPreviously Presented) A method according to claim 225 further including forming said material.

CLAIM-246. (NewPreviously Presented) A method according to claim 226 further including forming said material.

CLAIM-247. (NewPreviously Presented) A method according to claim 227 further including forming said material.

CLAIM-248. (NewPreviously Presented) A method according to claim 231 further including forming said material.

CLAIM-249. (NewCurrently Amended) A method according to any one of claims 182 to 207 242, 228, 229 or 230 further including providing said material-.

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CLAIM-250. (NewPreviously Presented) A method according to claim 213 further including providing said material.

CLAIM-251. (NewPreviously Presented) A method according to claim 214 further including providing said material.

CLAIM-252. (NewPreviously Presented) A method according to claim 215 further including providing said material.

CLAIM-253. (NewPreviously Presented) A method according to claim 216 further including providing said material.

CLAIM-254. (NewPreviously Presented) A method according to claim 217 further including providing said material.

CLAIM-255. (NewPreviously Presented) A method according to claim 218 further including providing said material.

CLAIM-256. (NewPreviously Presented) A method according to claim 219 further including providing said material.

CLAIM-257. (NewPreviously Presented) A method according to claim 220 further including providing said material.

CLAIM-258. (NewPreviously Presented) A method according to claim 221 further including providing said material.

CLAIM-259. (NewPreviously Presented) A method according to claim 222 further including providing said material.

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CLAIM-260. (NewPreviously Presented) A method according to claim 223 further including providing said material.

CLAIM-261. (NewPreviously Presented) A method according to claim 224 further including providing said material.

CLAIM-262. (NewPreviously Presented) A method according to claim 225 further including providing said material.

CLAIM-263. (NewPreviously Presented) A method according to claim 226 further including providing said material.

CLAIM-264. (NewPreviously Presented) A method according to claim 227 further including providing said material.

CLAIM-265. (NewPreviously Presented) A method according to claim 231 further including providing said material.

CLAIM-266. (NewPreviously Presented) A method according to any one of claims 182, 228, 229 or 230 wherein said superconducting current will substantially persist indefinitely unchanged in magnitude as long as superconductivity remains.

CLAIM-267. (NewPreviously Presented) A method according to any one of claims 182, 228, 229 or 230 wherein said superconducting current will substantially persist indefinitely unchanged in magnitude as long as superconductivity remains.

CLAIM-268. (NewCurrently Amended) An method comprising:

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maintaining a composition in a superconducting state at a temperature greater than or equal to 26°K;

said composition possesses possesses an electrical current passing through said composition while said composition is in said superconducting state; and

said composition comprising a transition metal, oxygen and any element selected from the group consisting of a Group II A element, a rare earth element and a Group III B element, where said composition is a mixed copper oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to 26°K.

CLAIM-269. (New Previously Presented). An method comprising:

maintaining a composition in a superconducting state at a temperature greater than or equal to 26°K;

said composition possesses possesses an electrical current passing through said composition while said composition is in said superconducting state; and

said composition comprising a transition metal, oxygen and (1) a rare earth element or a rare earth-like element or a group III B element, and/or (2) an alkaline earth element or a Group IIA element, where said composition exhibits a superconducting state at a temperature greater than or equal to 26°K.

CLAIM-270. (Previously PresentedNew) A method according to claim 268 wherein said transition metal is copper.

CLAIM-271. (NewPreviously Presented) A method according to claim 269 wherein said transition metal is copper.

CLAIM-272. (New Currently Amended) A method comprising:

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applying the <u>a</u> magnetic field or the <u>to cause</u> substantially zero resistance to the flow of electrical current of a material comprising a superconducting current flowing therein, said material comprising a  $T_c$  greater than or equal to  $26^{\circ}$ K;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM-273. (New Currently Amended) A method according to claim 272 further including maintaining said material at a temperature less than or equal to said to said T<sub>C</sub> and greater than or equal to 26°K.

CLAIM-274. (New Previously Presented) A method according to claim 272 further including providing a source of current for said superconducting current.

CLAIM-275. (NewPreviously Presented) A method according to claim 273 further including providing a source of current for said superconducting current.

CLAIM-276. (Previously PresentedNew) A method according to claim 272 wherein said material is maintained at a temperature less than or equal to said T<sub>c</sub> and greater than or equal to 26°K.

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CLAIM-277. (NewPreviously Presented) A method according to claim 273 wherein said material is maintained at a temperature less than or equal to said  $T_c$  and greater than or equal to 26°K.

CLAIM-278. (NewPreviously Presented) A method according to claim 274 wherein said material is maintained at a temperature less than or equal to said T<sub>C</sub> and greater than or equal to 26°K.

CLAIM-279. (NewPreviously Presented) A method according to claim 275 wherein said material is maintained at a temperature less than equal to said  $T_c$  and greater than or equal to 26°K.

CLAIM-280. (NewPreviously Presented) A method according to claim 272 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,

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- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,
- a perovskite type structure,
- a structure comprising a perovskite characteristic,
- a perovskite related structure,
- a crystalline structure,
- a layer-like crystalline structure,
- a structure which is structurally substantially similar to an orthorhombictetragonal phase of said material,
- a crystalline structure which enhances electron-phonon interactions to produce superconductivity,
- a structure enhancing the number of Jahn-Teller polarons in said material,

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a distorted crystalline structure characterized by an oxygen deficiency
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
a stoiciomeric oxygen content,
a non-stoiciomeric oxygen content,
a multivalent material,
a multivalent transition metal,
a transition metal element capable of exhibiting multivalent states,
a mixed valent material,
mixed valent ions,
mixed valent transition metal ions,
multivalent ions

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multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

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a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

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a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula  $Ba_xLa_{x-5}Cu_5O_Y$  wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said

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composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-281. (NewPreviously Presented) A method according to claim 273 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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```
a stoiciomeric oxygen content,
a non-stoiciomeric oxygen content,
a multivalent material,
a multivalent transition metal,
a transition metal element capable of exhibiting multivalent states,
a mixed valent material,
mixed valent ions,
mixed valent transition metal ions,
multivalent ions,
multivalent transition metal ions,
multivalent copper,
multivalent copper ions,
mixed valent copper,
mixed valent copper ions,
```

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula BaLa<sub>5-x</sub>Cu<sub>5</sub>O<sub>5(3-y)</sub>, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

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a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM 282. (NewPreviously Presented) A method according to claim 274 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper, mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material.

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K.

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula BaLa<sub>5-x</sub>Cu<sub>5</sub>O<sub>5(3-y)</sub>, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-283. (NewPreviously Presented) A method according to claim 275 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth,

rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K.

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-284. (NewPreviously Presented) A structure according to claim 276 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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a perovskite type structure, a structure comprising a perovskite characteristic, a perovskite related structure, a crystalline structure, a layer-like crystalline structure, a structure which is structurally substantially similar to an orthorhombictetragonal phase of said material, a crystalline structure which enhances electron-phonon interactions to produce superconductivity, a structure enhancing the number of Jahn-Teller polarons in said material, a distorted crystalline structure characterized by an oxygen deficiency, a structure comprising enhanced polaron formation, a ceramic material, a ceramic-like material, a ceramic characteristic, a ceramic type material,

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```
a stoiciomeric oxygen content,
a non-stoiciomeric oxygen content,
a multivalent material,
a multivalent transition metal,
a transition metal element capable of exhibiting multivalent states,
a mixed valent material,
mixed valent ions,
mixed valent transition metal ions,
multivalent ions,
multivalent transition metal ions,
multivalent copper,
multivalent copper ions,
mixed valent copper,
mixed valent copper ions,
a ceramic-like material in the RE-AE-TM-O system, where RE is a rare
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earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula BaLa<sub>5-x</sub>Cu<sub>5</sub>O<sub>5(3-y)</sub>, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM 285. (NewPreviously Presented) A method according to claim 277 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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```
a non-stoiciomeric oxygen content,
a multivalent material,
a multivalent transition metal,
a transition metal element capable of exhibiting multivalent states,
a mixed valent material,
mixed valent ions,
mixed valent transition metal ions,
multivalent ions,
multivalent transition metal ions,
multivalent copper,
multivalent copper ions,
mixed valent copper,
mixed valent copper ions,
a ceramic-like material in the RE-AE-TM-O system, where RE is a rare
earth or near rare earth element, AE is an alkaline earth element, TM is
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a stoiciomeric oxygen content,

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material.

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula BaLa<sub>5-x</sub>Cu<sub>5</sub>O<sub>5(3-y)</sub>, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

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a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-286. (NewPreviously Presented) A method according to claim 278 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material.
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K.

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-287. (Previously PresentedNew) A method according to claim 279 said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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mixed valent copper ions,

a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

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a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-288. (New Previously Presented) A method according to claim 272, wherein said transition metal is selected from the group consisting of copper, nickel and chromium.

CLAIM-289. (Currently AmendedNew) A method according to claim 272 wherein said rare earth-like elements include elements include elements comprising a rare earth characteristic property which makes it essentially a rare earth element.

CLAIM-290. (NewPreviously Presented) A method according to claim 272 wherein said composition comprises one or more of Be, Mg, Ca, Sr, Ba, Ra, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

CLAIM-291. (New Currently Amended) A method according to claim 272 wherein said composition comprises one or more of one or more of ef Be, Mg, Ca, Sr, Ba and Ra and one or more of Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

CLAIM-292. (NewPreviously Presented) A method according to claim 272 wherein said material can be made according to known principles of ceramic science.

CLAIM-293. (NewPreviously Presented) A method according to claim 272 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound.

CLAIM-294. (NewPreviously Presented) A method according to claim 272 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent copper compound.

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CLAIM-295. (NewPreviously Presented) A method according to claim 272 wherein said material comprises a multiphase material wherein at least one phase exhibits superconductivity.

CLAIM-296. (NewPreviously Presented) A method according to claim 272 wherein said method is a method of operation of a structure capable of magnetic levitation.

CLAIM-297. (NewPreviously Presented) A method according to claim 272 wherein said material comprises at least one element selected from each of said first element group and said second element group.

CLAIM-298. (New Currently Amended) A method according to any one of claims 272 to 296 or 297 wherein said superconducting current is flowing in a structure selected from the group consisting of:

a power generation device,

an electrical power transmission device,

an electrical power transmission element,

a coil,

a magnet,

a plasma device,

a nuclear device,

a nuclear magnetic resonace resonance device,

a nuclear magnetic imaging device,

a magnetic levitation device,

a power gerneation generation system,

a thermonuclear fusion device,

a switching device,

a Josephson junction device,

an electrical packaging device,

a circuit device,

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a electronic instrumentation device,

a train.

a magnetic suceptometer susceptometer, and

a magnetometer.

CLAIM-299. (NewCurrently Amended) A method according to any one of claims 272 to 297 or 298 wherein said superconducting current is flowing in a coil comprised of said material.

CLAIM-300. (New Previously Presented) A method according to claim 299 wherein said material possesses substantially zero electrical resistance.

CLAIM-301. (New Previously Presented) A method according to claim 299 wherein said coil possesses substantially zero electrical resistance.

CLAIM-302. (Previously Presented) New) A method according to claim 272 where in said superconducting current is flowing in a structure selected from the group consisting of a device, an apparatus, a circuit and a combination.

CLAIM-303. (New Currently Amended) A method according to any one of claims 272 to 297 301 or 302 wherein said material possesses substantially zero electrical resistance.

CLAIM-304. (New Currently Amended) A method according to any one of claims 272 to 297 301 or 302 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance, between said input and said output.

CLAIM-305. (New Previously Presented) A method according to claim 304 wherein said material possesses substantially zero electrical resistance.

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CLAIM-306. (NewPreviously Presented) A method according to any one of claims 272 to 280 or 281 wherein said superconducting current flows from an input of a circuit element to an output of said circuit element.

CLAIM-307. (Previously PresentedNew) A method according to claim 306 wherein said material possesses substantially zero electrical resistance.

CLAIM-308. (New Currently Amended) A method according to any one of claims 272 to 297 301 or 302 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

CLAIM-309. (Previously PresentedNew) A method according to claim 308 wherein said material possesses substantially zero electrical resistance.

CLAIM-310. (Currently AmendedNew) A method according to claim 272 to 297 er 298 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

CLAIM-311. (Previously PresentedNew) A method according to claim 300 wherein said material possesses substantially zero electrical resistance.

CLAIM-312. (New Previously Presented) A method according to claim 306 wherein said material is part of said circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

CLAIM-313. (NewPreviously Presented) A method according to claim 312 wherein said material possesses substantially zero electrical resistance.

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CLAIM-314. (New Currently Amended) A method according to any one of claims 272 to 297 or 298 wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.

CLAIM-315. (New Previously Presented) A method according to claim 314 wherein said material possesses substantially zero electrical resistance.

CLAIM-316. (NewPreviously Presented) A method according to claim 299 wherein said coil is carrying said superconducting current flowing therein without a source providing for said superconducting current.

GLAIM-317. (New Currently Amended) A method according to any one of claims 272 to 297 or 298 wherein said superconducting current is flowing without a source providing for said superconducting current.

CLAIM-318. (Currently Amended New). A method comprising:

applying the <u>a</u> magnetic field er the <u>to cause</u> substantially zero resistance to the flow of electrical current of a material comprising a superconducting current flowing therein, said material having a T<sub>c</sub> greater than or equal to 26°K;

said superconductive property is selected from the group consisting of the magnetic field caused by said superconducting current, the substantially zero resistance to the flow of said superconducting current and combinations thereof;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

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said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM-319. (New Currently Amended). A method comprising:

applying the <u>a</u> magnetic field <del>or the</del> <u>to cause</u> substantially zero resistance to the flow of electrical current of a material comprising a superconducting current flowing therein, said material with a T<sub>c</sub> greater than or equal to 26°K;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM-320. (New Currently Amended). A method comprising:

applying the <u>a</u> magnetic field <del>or the</del> <u>to cause</u> substantially zero resistance to the flow of electrical current of a material comprising a superconducting current flowing therein, said material possessing a T<sub>c</sub> greater than or equal to 26°K;

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said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM-321\_ (NewCurrently Amended) A method according to any one of claims 272, 319 or 320 wherein said rare earth-like elements include elements comprising include elements comprising a rare earth characteristic a property which makes it essentially a rare earth element.

CLAIM-322. (New Previously Presented) A method according to any one of claims 272 to 301 or 302 further including forming said material.

CLAIM-323. (NewPreviously Presented) A method according to claim 303 further including forming said material.

CLAIM-324. (NewPreviously Presented) A method according to claim 304 further including forming said material.

<u>CLAIM-325.</u> (New <u>Previously Presented</u>) A method according to claim 305 further including forming said material.

CLAIM-326. (Previously PresentedNew) A method according to claim 306 further including forming said material.

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CLAIM-327. (NewPreviously Presented) A method according to claim 307 further including forming said material.

CLAIM-328. (New Previously Presented) A method according to claim 308 further including forming said material.

CLAIM-329. (Previously PresentedNew) A method according to claim 309 further including forming said material.

CLAIM-330. (Previously PresentedNew) A method according to claim 310 further including forming said material.

CLAIM-331. (Previously PresentedNew) A method according to claim 311 further including forming said material.

CLAIM-332. (Previously PresentedNew) A method according to claim 312 further including forming said material.

CLAIM-333. (Previously PresentedNew) A method according to claim 313 further including forming said material.

CLAIM-334. (NewPreviously Presented) A method according to claim 314 further including forming said material.

CLAIM-335. (NewPreviously Presented) A method according to claim 315 further including forming said material.

CLAIM-336. (NewPreviously Presented) A method according to claim 316 further including forming said material.

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CLAIM-337. (NewPreviously Presented) A method according to claim 317 further including forming said material.

CLAIM-338. (Previously PresentedNew) A method according to claim 318 further including forming said material.

CLAIM-339. (NewCurrently Amended) A method according to any one of claims 272 to 297 301 or 302 further including providing said -material.

CLAIM-340. (Previously Presented New) A method according to claim 303 further including providing said material.

CLAIM-341. (Previously PresentedNew) A method according to claim 304 further including providing said material.

CLAIM-342. (Previously PresentedNew) A method according to claim 305 further including providing said material.

CLAIM-343. (NewPreviously Presented) A method according to claim 306 further including providing said material.

CLAIM-344. (NewPreviously Presented) A method according to claim 307 further including providing said material.

CLAIM-345. (New Previously Presented) A method according to claim 308 further including providing said material.

CLAIM-346. (NewPreviously Presented) A method according to claim 309 further including providing said material.

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CLAIM-347. (NewPreviously Presented) A method according to claim 310 further including providing said material.

CLAIM-348. (NewPreviously Presented) A method according to claim 311 further including providing said material.

CLAIM 349 (<u>Previously Presented</u>New) A method according to claim 312 further including providing said material.

CLAIM 350 (<u>Previously Presented</u>New) A method according to claim 313 further including providing said material.

CLAIM-351. (NewPreviously Presented) A method according to claim 314 further including providing said material.

CLAIM-352. (NewPreviously Presented) A method according to claim 315 further including providing said material.

CLAIM-353. (NewPreviously Presented) A method according to claim 316 further including providing said material.

CLAIM-354. (NewPreviously Presented) A method according to claim 317 further including providing said material.

CLAIM 355 (<u>Previously Presented</u>New) A method according to claim 318 further including providing said material.

CLAIM-356. (New Currently Amended) An method comprising:

providing a composition comprising a transition metal, oxygen and any element selected from the group consisting of a Group II A element, a rare earth element

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and a Group III B element, where said composition is a mixed copper oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

wherein said composition possesses possesses an electrical current passing through said composition while said composition is in said superconducting state.

CLAIM-357. (NewCurrently Amended). An method comprising:

providing a composition comprising a transition metal, oxygen and (1) a rare earth element or a rare earth-like element or a group III B element, and/or (2) an alkaline earth element or a Group IIA element, where said composition exhibits a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

wherein said composition possesses possesses an electrical current passing through said composition while said composition is in said superconducting state.

CLAIM-358. (Previously PresentedNew) A method according to claim 356 wherein said transition metal is copper.

<u>CLAIM-359.</u> (New <u>Previously Presented</u>) A method according to claim 357 wherein said transition metal is copper.

CLAIM-360. (NewPreviously Presented). A method comprising:

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providing a material, said material possesses a superconducting current flowing therein, said material comprising a T<sub>c</sub> greater than or equal to 26°K;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM-361. (New Currently Amended) A method according to claim 360 further including maintaining said material at a temperature less than or equal to said to said T<sub>C</sub> and greater than or equal to 26°K.

CLAIM-362. (New Previously Presented) A method according to claim 360 further including providing a source of current for said superconducting current.

CLAIM-363. (NewPreviously Presented) A method according to claim 361 further including providing a source of current for said superconducting current.

CLAIM-364. (NewPreviously Presented) A method according to claim 360 wherein said material is maintained at a temperature less than or equal to said  $T_c$  and greater than or equal to  $26^{\circ}$ K.

CLAIM-365. (NewPreviously Presented) A method according to claim 361 wherein said material is maintained at a temperature less than or equal to said T<sub>c</sub> and greater than or equal to 26°K.

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CLAIM-366. (NewPreviously Presented) A method according to claim 362 wherein said material is maintained at a temperature less than or equal to said  $T_c$  and greater than or equal to  $26^{\circ}$ K.

CLAIM-367. (New Previously Presented) A method according to claim 363 wherein said material is maintained at a temperature less than equal to said  $T_c$  and greater than or equal to 26°K.

CLAIM-368. (NewPreviously Presented) A method according to claim 360 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,

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a substantially layered perovskite crystal structure,

a perovskite structure,

a substantially perovskite structure,

a perovskite-like structure,

a perovskite type structure,

a structure comprising a perovskite characteristic,

a perovskite related structure,

a crystalline structure,

a layer-like crystalline structure,

a structure which is structurally substantially similar to an orthorhombictetragonal phase of said material,

a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

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a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
a stoiciomeric oxygen content,
a non-stoiciomeric oxygen content,
a multivalent material,
a multivalent transition metal,
a transition metal element capable of exhibiting multivalent states,
a mixed valent material,
mixed valent ions,
mixed valent transition metal ions,
multivalent ions,
multivalent transition metal ions,
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multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

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a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

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a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

CLAIM-369. (NewPreviously Presented) A method according to claim 361 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,

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- a layered-type structure, a layered characteristic, a layered perovskite structure, a layered perovskite crystal structure, a substantially layered perovskite structure, a substantially layered perovskite crystal structure, a perovskite structure, a substantially perovskite structure, a perovskite-like structure, a perovskite type structure, a structure comprising a perovskite characteristic, a perovskite related structure,
- a layer-like crystalline structure,

a crystalline structure,

a structure which is structurally substantially similar to an orthorhombictetragonal phase of said material,

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a crystalline structure which enhances electron-phonon interactions to produce superconductivity,

a structure enhancing the number of Jahn-Teller polarons in said material,

a distorted crystalline structure characterized by an oxygen deficiency,

a structure comprising enhanced polaron formation,

a ceramic material,

a ceramic-like material,

a ceramic characteristic,

a ceramic type material,

a stoiciomeric oxygen content,

a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

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mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

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a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

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a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K.

at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

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a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM 370. (NewPreviously Presented) A method according to claim 362 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper, mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-371. (NewPreviously Presented) A method according to claim 363 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,

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- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper, mixed valent copper ions, a ceramic-like material in the RE-AE-TM-O system, where RE is a rare

earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth,

rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM 372. (NewPreviously Presented) A structure according to claim 364 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper, mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K.

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-373. (Previously PresentedNew) A method according to claim 365 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
 a structure comprising a perovskite characteristic,
 a perovskite related structure,
 a crystalline structure,
 a layer-like crystalline structure,
 a structure which is structurally substantially similar to an orthorhombic-
 tetragonal phase of said material,
 a crystalline structure which enhances electron-phonon interactions to
 produce superconductivity,
 a structure enhancing the number of Jahn-Teller polarons in said
 material,
 a distorted crystalline structure characterized by an oxygen deficiency,
 a structure comprising enhanced polaron formation,
 a ceramic material,
 a ceramic-like material,
 a ceramic characteristic,
 a ceramic type material,
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a stoiciomeric oxygen content,
a non-stoiciomeric oxygen content,
a multivalent material,
a multivalent transition metal,
a transition metal element capable of exhibiting multivalent states,
a mixed valent material,
mixed valent ions,
mixed valent transition metal ions,
multivalent ions,
multivalent transition metal ions,
multivalent copper,
multivalent copper ions,
mixed valent copper,
mixed valent copper ions,
```

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide.

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K.

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

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a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-374. (Previously PresentedNew) A method according to claim 366 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper, mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K.

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-375. (Previously Presented New) A method according to claim 367 said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper, mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

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a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-376. (NewPreviously Presented) A method according to claim 360 wherein said transition metal is selected from the group consisting of copper, nickel and chromium.

CLAIM-377. (New Currently Amended) A method according to claim 360 wherein said rare earth-like elements include elements comprising a rare-earth characteristic property which makes it essentially a rare earth element.

CLAIM-378. (New Previously Presented) A method according to claim 360 wherein said composition comprises one or more of Be, Mg, Ca, Sr, Ba, Ra, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

CLAIM-379. (NewPreviously Presented) A method according to claim 360 wherein said composition comprises one or more of one or more of Se, Mg, Ca, Sr, Ba and Ra and one or more of Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

CLAIM-380. (Previously PresentedNew) A method according to claim 360 wherein said material can be made according to known principles of ceramic science.

CLAIM-381. (Previously PresentedNew) A method according to claim 360 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound.

CLAIM-382. (NewPreviously Presented) A method according to claim 360 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent copper compound.

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CLAIM-383. (NewPreviously Presented) A method according to claim 360 wherein said material comprises a multiphase material wherein at least one phase exhibits superconductivity.

CLAIM-384. (New Previously Presented) A method according to claim 360 wherein said method is a method of operation of a structure selected from the group consisting of an apparatus, a device, a circuit and a combination.

CLAIM-385. (NewPreviously Presented) A method according to claim 360 wherein said material comprises at least one element selected from each of said first element group and said second element group.

CLAIM-386. (Previously PresentedNew) A method according to any one of claims 360 to 384 or 385 wherein said superconducting current is flowing in a structure selected from the group consisting of:

a power generation device,

an electrical power transmission device,

an electrical power transmission element,

a coil,

a magnet,

a plasma device,

a nuclear device,

a nuclear magnetic resonace device,

a nuclear magnetic imaging device,

a magnetic levitation device,

a power gerneation system,

a thermonuclear fusion device,

a switching device,

a Josephson junction device,

an electrical packaging device,

a circuit device,

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a electronic instrumentation device.

a train,

a magnetic suceptomoter, and

a magnetometer.

CLAIM-387. (New Currently Amended) A method according to any one of claims 360 to 385 or 386 wherein said superconducting current is flowing in a coil comprised of said material.

CLAIM-388. (New Previously Presented) A method according to claim 387 wherein said material possesses substantially zero electrical resistance.

CLAIM-389. (Previously PresentedNew) A method according to claim 387 wherein said coil possesses substantially zero electrical resistance.

CLAIM-390. (Previously PresentedNew) A method according to claim 360 where in said superconducting current is flowing in a structure selected from the group consisting of a device, an apparatus, a circuit and a combination.

CLAIM-391. (NewCurrently Amended) A method according to any one of claims 360 to 385 389 or 390 wherein said material possesses substantially zero electrical resistance.

CLAIM-392. (New Currently Amended) A method according to any one of claims 360 to 385 er-386 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance. between said input and said output.

CLAIM-393. (New Previously Presented) A method according to claim 392 wherein said material possesses substantially zero electrical resistance.

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CLAIM-394. (Previously PresentedNew) A method according to any one of claims 360 to 368 or 369 wherein said superconducting current flows from an input of a circuit element to an output of said circuit element.

CLAIM-395. (New Previously Presented) A method according to claim 394 wherein said material possesses substantially zero electrical resistance.

CLAIM-396. (New Currently Amended) A method according to any one of claims 360 to 385 389 or 390 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

CLAIM-397. (NewPreviously Presented) A method according to claim 396 wherein said material possesses substantially zero electrical resistance.

CLAIM-398. (New Currently Amended) A method according to any one of claims 360 to 385 or 386 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

<u>CLAIM-399.</u> (<u>NewPreviously Presented</u>) A method according to claim 388 wherein said material possesses substantially zero electrical resistance.

CLAIM-400. (Previously PresentedNew) A method according to claim 394 wherein said material is part of said circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

CLAIM-401. (Previously PresentedNew) A method according to claim 400 wherein said material possesses substantially zero electrical resistance.

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CLAIM 402. (New Currently Amended) A method according to any one of claims 360 to 385 or 386 wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.

CLAIM 403. (New Previously Presented) A method according to claim 402 wherein said material possesses substantially zero electrical resistance.

CLAIM 404. (NewPreviously Presented) A method according to claim 387 wherein said coil is carrying said superconducting current flowing therein without a source providing for said superconducting current.

CLAIM 405. (New Currently Amended) A method according to any one of claims 360 to 385 or 386 wherein said superconducting current is flowing without a source providing for said superconducting current.

CLAIM-406. (New Previously Presented). A method comprising:

providing a material, said material possesses a superconducting current flowing therein, said material having a T<sub>c</sub> greater than or equal to 26°K;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

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CLAIM-407. (New Previously Presented) A method comprising:

providing a material, said material possesses a superconducting current flowing therein, said material with a T<sub>c</sub> greater than or equal to 26°K;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM 408. (NewCurrently Amended). A method comprising:

providing a material, said material possesses possesses a superconducting current flowing therein, said material possessing a  $T_c$  greater than or equal to  $26^{\circ}$ K;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

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CLAIM 409. (New Currently Amended) A method according to any one of claims 360, 406, 407 or 408 wherein said rare earth-like elements include elements comprising a rare earth characteristic property which makes it essentially a rare earth element.

CLAIM 410. (NewCurrently Amended) A method according to any one of claims 360- to 385 390-or 391 390 further including forming said -material-.

CLAIM-411. (NewPreviously Presented) A method according to claim 391 further including forming said material.

CLAIM-412. (NewPreviously Presented) A method according to claim 392 further including forming said material.

CLAIM-413. (NewPreviously Presented) A method according to claim 393 further including forming said material.

CLAIM 414. (Previously PresentedNew) A method according to claim 394 further including forming said material.

CLAIM 415. (New)Previously Presented) A method according to claim 395 further including forming said material.

CLAIM-416. (NewPreviously Presented) A method according to claim 396 further including forming said material.

CLAIM-417. (NewPreviously Presented) A method according to claim 397 further including forming said material.

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CLAIM 418. (NewPreviously Presented) A method according to claim 398 further including forming said material.

CLAIM 419. (NewPreviously Presented) A method according to claim 399 further including forming said material.

CLAIM 420. (Previously PresentedNew) A method according to claim 400 further including forming said material.

CLAIM-421. (NewPreviously Presented) A method according to claim 401 further including forming said material.

CLAIM 422. (NewPreviously Presented) A method according to claim 402 further including forming said material.

CLAIM 423. (NewPreviously Presented) A method according to claim 403 further including forming said material.

CLAIM 424. (New Previously Presented) A method according to claim 404 further including forming said material.

CLAIM 425. (NewPreviously Presented) A method according to claim 405 further including forming said material.

CLAIM 426. (NewPreviously Presented) A method according to claim 406 further including forming said material.

CLAIM 427. (New Previously Presented) A method according to any one of claims 272, 318, 319, 320, 360, 406, 407, or 408 wherein said superconducting

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current will substantially persist indefinitely unchanged in magnitude as long as superconductivity remains.

CLAIM-428. (Previously PresentedNew) A method according to any one of claims 272, 318, 319, 320, 360, 406, 407, or 408 wherein said superconducting current will substantially persist indefinitely unchanged in magnitude as long as superconductivity remains.

CLAIM-429. (Previously Presented New) An method comprising:

providing a structure comprising a composition comprising a transition metal, oxygen and any element selected from the group consisting of a Group II A element, a rare earth element and a Group III B element, where said composition is a mixed copper oxide having a non-stoichiometric amount of oxygen therein and exhibiting a superconducting state at a temperature greater than or equal to 26°K;

maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

an electrical current passing through said composition while said composition is in said superconducting state.

CLAIM 430. (New Previously Presented). An method comprising:

providing a structure comprising a composition comprising a transition metal, oxygen and (1) a rare earth element or a rare earth-like element or a group III B element, and/or (2) an alkaline earth element or a Group IIA element, where said composition exhibits a superconducting state at a temperature greater than or equal to 26°K;

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maintaining said composition in said superconducting state at a temperature greater than or equal to 26°K; and

an electrical current passing through said composition while said composition is in said superconducting state.

CLAIM 431. (NewPreviously Presented) A method according to claim 429 wherein said transition metal is copper.

CLAIM 432. (NewPreviously Presented) A method according to claim 430 wherein said transition metal is copper.

CLAIM 433. (New Previously Presented). A method comprising:

providing a structure selected from the group consisting of a device, a circuit and an apparatus, said structure comprising a material comprising a  $T_c$  greater than or equal to  $26^{\circ}K_{\dot{\tau}}$ 

said material comprises a property selected from the group consisting of being capable of carrying a superconducting current and exhibiting a substantially zero resistance to the flow of electrical current therethrough when in a superconducting state;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

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CLAIM 434. (New Previously Presented) A method according to claim 433 further including providing a source of cooling said material at a temperature less than or equal to said to said T<sub>C</sub>.

CLAIM-435. (NewPreviously Presented) A method according to claim 433 further including providing a source of current for said superconducting current.

CLAIM-436. (NewPreviously Presented) A method according to claim 434 further including providing a source of current for said superconducting current.

CLAIM 437. (NewPreviously Presented) A method according to claim 433 wherein said material is maintained at a temperature less than or equal to said T<sub>c</sub> and greater than or equal to 26°K.

CLAIM 438. (NewPreviously Presented) A method according to claim 434 wherein said material is maintained at a temperature less than or equal to said T<sub>c</sub> and greater than or equal to 26°K.

CLAIM 439. (New Previously Presented) A method according to claim 435 wherein said material is maintained at a temperature less than or equal to said T<sub>C</sub> and greater than or equal to 26°K.

CLAIM-440. (NewPreviously Presented) A method according to claim 436 wherein said material is maintained at a temperature less than equal to said T<sub>c</sub> and greater than or equal to 26°K.

CLAIM 441. (NewPreviously Presented) A method according to claim 433 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

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- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,
- a perovskite type structure,
- a structure comprising a perovskite characteristic,

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```
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
a stoiciomeric oxygen content,
a non-stoiciomeric oxygen content,
```

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a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

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a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

a mixed oxide with alkaline earth-like doping,

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a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K.

at least four elements, none of which is itself a superconductor,

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a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula BaLa<sub>5-x</sub>Cu<sub>5</sub>O<sub>5(3-y)</sub>, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

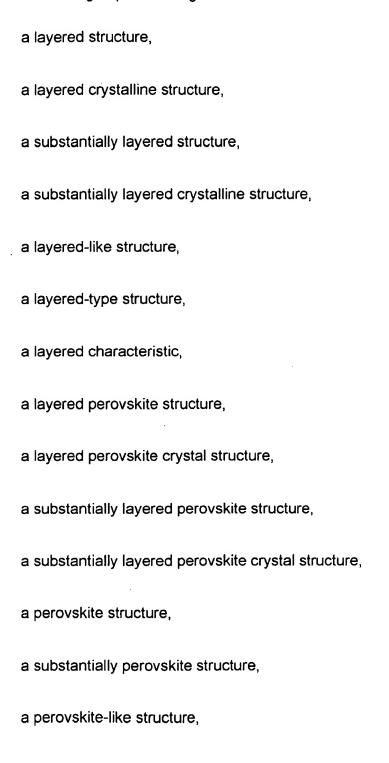
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a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM 442. (New Previously Presented) A method according to claim 434 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:



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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is a multivalent transition metal element having at least two valence states

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mixed valent copper ions,

in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

at least four elements, none of which is itself a superconductor,

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a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

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a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM 443. (NewPreviously Presented) A method according to claim 435 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
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a stoiciomeric oxygen content,
a non-stoiciomeric oxygen content,
a multivalent material,
a multivalent transition metal,
a transition metal element capable of exhibiting multivalent states,
a mixed valent material,
mixed valent ions,
mixed valent transition metal ions,
multivalent ions,
multivalent transition metal ions,
multivalent copper,
multivalent copper ions,
mixed valent copper,
mixed valent copper ions,
a ceramic-like material in the RE-AE-TM-O system, where RE is a rare
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earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material.

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K.

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity.

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-444. (NewPreviously Presented) A method according to claim 436 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
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a stoiciomeric oxygen content,
a non-stoiciomeric oxygen content,
a multivalent material,
a multivalent transition metal,
a transition metal element capable of exhibiting multivalent states,
a mixed valent material,
mixed valent ions,
mixed valent transition metal ions,
multivalent ions,
multivalent transition metal ions,
multivalent copper,
multivalent copper ions,
mixed valent copper,
mixed valent copper ions,
a ceramic-like material in the RE-AE-TM-O system, where RE is a rare
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earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth,

rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K.

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about  $540^{\circ}C$  to about  $950^{\circ}C$  and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to  $26^{\circ}K$ ,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM 445. (NewPreviously Presented) A structure according to claim 437 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, 'multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper, mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material.

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula BaLa<sub>5-x</sub>Cu<sub>5</sub>O<sub>5(3-y)</sub>, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM 446. (New Previously Presented) A method according to claim 438 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper, mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula BaLa<sub>5-x</sub>Cu<sub>5</sub>O<sub>5(3-y)</sub>, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

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a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-447. (NewPreviously Presented) A method according to claim 439 wherein said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material.
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
```

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a stoiciomeric oxygen content, a non-stoiciomeric oxygen content, a multivalent material, a multivalent transition metal, a transition metal element capable of exhibiting multivalent states, a mixed valent material, mixed valent ions, mixed valent transition metal ions, multivalent ions, multivalent transition metal ions, multivalent copper, multivalent copper ions, mixed valent copper, mixed valent copper ions, a ceramic-like material in the RE-AE-TM-O system, where RE is a rare

earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states,

a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula BaLa<sub>5-x</sub>Cu<sub>5</sub>O<sub>5(3-y)</sub>, wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

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a composition wherein at least one element is in a nonstoichiometric atomic proportion;

a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM 448. (NewPreviously Presented) A method according to claim 440 said material comprises at least one phase which comprises a property selected from the group consisting of:

- a layered structure,
- a layered crystalline structure,
- a substantially layered structure,
- a substantially layered crystalline structure,
- a layered-like structure,
- a layered-type structure,
- a layered characteristic,
- a layered perovskite structure,
- a layered perovskite crystal structure,
- a substantially layered perovskite structure,
- a substantially layered perovskite crystal structure,
- a perovskite structure,
- a substantially perovskite structure,
- a perovskite-like structure,

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```
a perovskite type structure,
a structure comprising a perovskite characteristic,
a perovskite related structure,
a crystalline structure,
a layer-like crystalline structure,
a structure which is structurally substantially similar to an orthorhombic-
tetragonal phase of said material,
a crystalline structure which enhances electron-phonon interactions to
produce superconductivity,
a structure enhancing the number of Jahn-Teller polarons in said
material,
a distorted crystalline structure characterized by an oxygen deficiency,
a structure comprising enhanced polaron formation,
a ceramic material,
a ceramic-like material,
a ceramic characteristic,
a ceramic type material,
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a stoiciomeric oxygen content,
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a non-stoiciomeric oxygen content,

a multivalent material,

a multivalent transition metal,

a transition metal element capable of exhibiting multivalent states,

a mixed valent material,

mixed valent ions,

mixed valent transition metal ions,

multivalent ions,

multivalent transition metal ions,

multivalent copper,

multivalent copper ions,

mixed valent copper,

mixed valent copper ions,

a ceramic-like material in the RE-AE-TM-O system, where RE is a rare earth or near rare earth element, AE is an alkaline earth element, TM is

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a multivalent transition metal element having at least two valence states in said ceramic-like material, and O is oxygen wherein the ratio of the amounts of said transition metal in said two valence states being determined by the ratio RE: AE,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 1:1,

a mixed copper oxide material including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE) where the ratio (AE,RE):Cu is substantially 2:1

a structure comprising a distorted octahedral oxygen environment,

a distorted orthorhombic crystalline structure,

an alkaline earth element substituted for at least one atom of said rare earth, rare earth-like element or rare earth characteristic in said material

a transition metal oxide,

a mixed transition metal oxide,

a copper oxide,

a mixed oxide,

a mixed oxide with alkaline earth doping,

a substituted transition metal oxide,

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a mixed oxide with alkaline earth-like doping,

a copper oxide wherein said alkaline earth or alkaline earth element is atomically large with respect to copper,

a copper oxide doped with an alkaline earth element, alkaline earth like element, or an element with an alkaline earth characteristic where the concentration of said alkaline earth element, alkaline earth like element, or said element with an alkaline earth characteristic is near to the concentration of said alkaline earth element, alkaline earth like element or said element with an alkaline earth characteristic where the superconducting copper oxide phase in said material undergoes an orthorhombic to tetragonal structural phase transition,

a mixed copper oxide doped with an element chosen to result in Cu<sup>3+</sup> ions in said material,

a doped transition metal oxide,

a copper oxide wherein at least one other element is an element which results in Cu<sup>3+</sup> ions in said material,

a copper oxide wherein at least one other element is an element chosen to result in the presence of both Cu<sup>2+</sup> and Cu<sup>3+</sup> ions,

a substituted copper oxide exhibiting mixed valence states,

a superconductor being comprised of at least four elements, none of which is itself superconducting at a temperature greater than or equal to 26°K,

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at least four elements, none of which is itself a superconductor,

a superconductor being comprised of said transition element which itself is not superconducting,

a superconductor being an oxide having multivalent oxidation states, a transition metal oxide having substitutions therein, the amount of said substitutions being sufficient to produce sufficient electron-phonon interactions in said material that said material exhibits said superconductivity,

a crystalline mixed valent oxide having a layer-like structure,

at least one element in a nonstoichiometric atomic proportion,

a composition of the formula Ba<sub>x</sub>La<sub>x-5</sub>Cu<sub>5</sub>O<sub>Y</sub> wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition of the formula  $BaLa_{5-x}Cu_5O_{5(3-y)}$ , wherein x is from about 0.75 to about 1 and y is the oxygen deficiency resulting from annealing said composition at temperatures from about 540°C to about 950°C and for times of about 15 minutes to about 12 hours, said composition having a metal oxide phase which exhibits a superconducting state at a critical temperature greater than or equal to 26°K,

a composition wherein at least one element is in a nonstoichiometric atomic proportion;

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a composition comprising a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound, and

combinations thereof.

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CLAIM-449. (NewPreviously Presented) A method according to claim 433 wherein said transition metal is selected from the group consisting of copper, nickel and chromium.

CLAIM 450. (New Currently Amended) A method according to claim 433 wherein said rare earth-like elements include elements comprising a rare earth characteristic property which makes it essentially a rare earth element.

CLAIM 451. (New Previously Presented) A method according to claim 433 wherein said composition comprises one or more of Be, Mg, Ca, Sr, Ba, Ra, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

CLAIM 452. (New Previously Presented) A method according to claim 433 wherein said composition comprises one or more of one or more of Be, Mg, Ca, Sr, Ba and Ra and one or more of Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu.

CLAIM 453. (New Previously Presented) A method according to claim 433 wherein said material can be made according to known principles of ceramic science.

CLAIM 454. (New Previously Presented) A method according to claim 433 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent transition metal compound.

CLAIM 455. (New Previously Presented) A method according to claim 433 wherein said material comprises a metallic, oxygen-deficient, perovskite-like, mixed valent copper compound.

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CLAIM 456. (NewPreviously Presented) A method according to claim 433 wherein said material comprises a multiphase material wherein at least one phase exhibits superconductivity.

CLAIM 457. (New Previously Presented) A method according to claim 433 wherein said method is a method of operation of a capable of magnetic levitation.

CLAIM 458. (New Previously Presented) A method according to claim 433 wherein said material comprises at least one element selected from each of said first element group and said second element group.

CLAIM 459. (New Previously Presented) A method according to any one of claims 433 to 457 or 458 wherein said superconducting current is capable of flowing in a structure selected from the group consisting of:

a power generation device,

an electrical power transmission device,

an electrical power transmission element,

a coil,

a magnet,

a plasma device,

a nuclear device,

a nuclear magnetic resonace device,

a nuclear magnetic imaging device,

a magnetic levitation device,

a power gerneation system,

a thermonuclear fusion device,

a switching device,

a Josephson junction device,

an electrical packaging device,

a circuit device.

a electronic instrumentation device,

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a train

a magnetic suceptomoter, and

a magnetometer.

CLAIM 387 460. (NewCurrently Amended) A method according to any one of claims 433 to 458 er 459 wherein said superconducting current is capable of flowing in a coil comprised of said material.

CLAIM 461. (New Previously Presented) A method according to claim 460 wherein said material possesses substantially zero electrical resistance.

CLAIM-462. (New Previously Presented) A method according to claim 460 wherein said coil possesses substantially zero electrical resistance.

CLAIM 463. (NewPreviously Presented) A method according to claim 433 where in said superconducting current is capable of flowing in a structure selected from the group consisting of a device, an apparatus, a circuit and a combination.

CLAIM 464. (New Currently Amended) A method according to any one of claims 433 to 458 462 or 463 wherein said material possesses substantially zero electrical resistance.

CLAIM 465. (New Currently Amended) A method according to any one of claims 433 to 458 or 459 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance-between said input and said output.

CLAIM 466. (NewPreviously Presented) A method according to claim 465 wherein said material possesses substantially zero electrical resistance.

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CLAIM 467. (New Previously Presented) A method according to any one of claims 433 to 441 or 442 wherein said superconducting is capable of flowing from an input of a circuit element to an output of said circuit element.

CLAIM-468. (NewPreviously Presented) A method according to claim 467 wherein said material possesses substantially zero electrical resistance.

CLAIM 469. (New Currently Amended) A method according to any one of claims 433 to 458 462 or 463 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

CLAIM 470. (NewPreviously Presented) A method according to claim 469 wherein said material possesses substantially zero electrical resistance.

CLAIM 471. (New Currently Amended) A method according to any one of claims 433 to 458 or 459 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

CLAIM-472. (NewPreviously Presented) A method according to claim 461 wherein said material possesses substantially zero electrical resistance.

CLAIM 473. (New Previously Presented) A method according to claim 467 wherein said material is part of said circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

CLAIM 474. (NewPreviously Presented) A method according to claim 473 wherein said material possesses substantially zero electrical resistance.

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CLAIM 475. (New Currently Amended) A method according to any one of claims 433 to 458 or 459 wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.

CLAIM-476. (NewPreviously Presented) A method according to claim 475 wherein said material possesses substantially zero electrical resistance.

CLAIM 477. (New Previously Presented) A method according to claim 460 wherein said coil is capable of carrying said superconducting current flowing therein without a source providing for said superconducting current.

CLAIM-478. (New Currently Amended) A method according to any one of claims 433 to 458 er-459 wherein said superconducting current is capable of flowing without a source providing for said superconducting current.

CLAIM-479. (NewPreviously Presented) A method comprising:

providing a structure selected from the group consisting of a device, a circuit and an apparatus, said structure comprising a material having a  $T_c$  greater than or equal to  $26^\circ K_7$ .

said material comprises a property selected from the group consisting of being capable of carrying a superconducting current and exhibiting a substantially zero resistance to the flow of electrical current therethrough when in a superconducting state;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

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said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM 480. (New Previously Presented) A method comprising:

providing a structure selected from the group consisting of a device, a circuit and an apparatus, said structure comprising a material with a  $T_c$  greater than or equal to  $26^{\circ} K_{;\bar{i}}$ 

said material comprises a property selected from the group consisting of being capable of carrying a superconducting current and exhibiting a substantially zero resistance to the flow of electrical current therethrough when in a superconducting state;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof;

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM 481. (NewPreviously Presented) A method comprising:

providing a structure comprising a material possessing a  $T_c$  greater than or equal to  $26^\circ K_{\dot{\tau}}$ 

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said material comprises a property selected from the group consisting of being capable of carrying a superconducting current and exhibiting a substantially zero resistance to the flow of electrical current therethrough when in a superconducting state;

said material comprises a transition metal, oxygen and at least one element selected from the group consisting of a first element group, a second element group and combinations thereof,

said first element group comprises rare earth elements, rare earth-like elements and Group IIIB elements, and

said second element group comprises alkaline earth elements and Group IIA elements.

CLAIM 482. (NewCurrently Amended) A method according to any one of claims 433, 479, 480 or 481 wherein said rare earth-like elements include elements comprising a rare earth characteristic property which makes it essentially a rare earth element.

CLAIM 483. (New Previously Presented) A method according to any one of 433, 479, 480 or 481 wherein said superconducting current will substantially persist indefinitely unchanged in magnitude as long as superconductivity remains.

CLAIM 484. (New Previously Presented) A method according to any one of claims 433, 479, 480 or 481 wherein said superconducting current will substantially persist indefinitely unchanged in magnitude as long as superconductivity remains in a coil of said material.

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- CLAIM 485. (New Currently Amended) A method according to any one of claims 433, 479, 480 or 481 wherein said method comprises a method of fabricating said structure is in a manufacturing method.
- 486. (New) A method according to claim 208 wherein said superconducting current is flowing in a coil comprised of said material.
- 487. (New) A method according to claim 486 wherein said material possesses substantially zero electrical resistance.
- 488. (New) A method according to claim 486 wherein said coil possesses substantially zero electrical resistance.
- 489. (New) A method according to claim 208 wherein said material possesses substantially zero electrical resistance.
- 490. (New) A method according to claim 209 wherein said material possesses substantially zero electrical resistance.
- 491. (New) A method according to claim 210 wherein said material possesses substantially zero electrical resistance.
- 492. (New) A method according to claim 211 wherein said material possesses substantially zero electrical resistance.
- 493. (New) A method according to claim 212 wherein said material possesses substantially zero electrical resistance.
- 494. (New) A method according to claim 208 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input

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current and an output capable of outputting an output current through substantially zero electrical resistance between said input and said output.

495. (New) A method according to claim 494 wherein said material possesses substantially zero electrical resistance.

496. (New) A method according to claim 208 wherein said superconducting current flows from an input of a circuit element to an output of said circuit element.

497. (New) A method according to claim 493 wherein said material possesses substantially zero electrical resistance.

498. (New) A method according claim 208 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

499. (New) A method according claim 209 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

500. (New) A method according claim 210 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

501. (New) A method according claim 211 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

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- 502. (New) A method according claim 212 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.
- 503. (New) A method according to claim 498 wherein said material possesses substantially zero electrical resistance.
- 504. (New) A method according to claim 499 wherein said material possesses substantially zero electrical resistance.
- 505. (New) A method according to claim 500 wherein said material possesses substantially zero electrical resistance.
- 506. (New) A method according to claim 501 wherein said material possesses substantially zero electrical resistance.
- 507. (New) A method according to claim 502 wherein said material possesses substantially zero electrical resistance.
- 508. (New) A method according to claim 208 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.
- 509. (New) A method according to claim 508 wherein said material possesses substantially zero electrical resistance.
- 510. (New) A method according to claim 496 wherein said material is part of said circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.

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- 511. (New) A method according to claim 510 wherein said material possesses substantially zero electrical resistance.
- 512. (New) A method according to claim 208 wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.
- 513. (New) A method according to claim 512 wherein said material possesses substantially zero electrical resistance.
- 514. (New) A structure according to claim 208 wherein said superconducting current is flowing without a source providing for said superconducting current.
- 515. (New) A method according to claim 208 further including forming said material.
- 516. (New) A method according to claim 209 further including forming said material.
- 517. (New) A method according to claim 210 further including forming said material.
- 518. (New) A method according to claim 211 further including forming said material.
- 519. (New) A method according to claim 212 further including forming said material.
- 520. (New) A method according to claim 208 further including providing said material.

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- 521. (New) A method according to claim 209 further including providing said material.
- 522. (New) A method according to claim 210 further including providing said material.
- 523. (New) A method according to claim 211 further including providing said material.
- 524. (New) A method according to claim 212 further including providing said material.
- 525. (New) A method according to claim 298 wherein said superconducting current is flowing in a coil comprised of said material.
- 526. (New) A method according to claim 525 wherein said material possesses substantially zero electrical resistance.
- 527. (New) A method according to claim 525 wherein said coil possesses substantially zero electrical resistance.
- 528. (New) A method according to 298 wherein said material possesses substantially zero electrical resistance.
- 529. (New) A method according to 299 wherein said material possesses substantially zero electrical resistance.
- 530. (New) A method according to 300 wherein said material possesses substantially zero electrical resistance.

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- 531. (New) A method according to 301 wherein said material possesses substantially zero electrical resistance.
- 532. (New) A method according to 302 wherein said material possesses substantially zero electrical resistance.
- 533. (New) A method according to claim 298 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance, between said input and said output.
- 534. (New) A method according to claim 299 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance, between said input and said output.
- 535. (New) A method according to claim 300 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance, between said input and said output.
- 536. (New) A method according to claim 301 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance, between said input and said output.
- 537. (New) A method according to claim 302 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance, between said input and said output.

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538. (New) A method according to claim 533 wherein said material possesses substantially zero electrical resistance.

539. (New) A method according to claim 534 wherein said material possesses substantially zero electrical resistance.

540. (New) A method according to claim 535 wherein said material possesses substantially zero electrical resistance.

541. (New) A method according to claim 536 wherein said material possesses substantially zero electrical resistance.

542. (New) A method according to claim 537 wherein said material possesses substantially zero electrical resistance.

543. (New) A method according to claim 298 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

544. (New) A method according to claim 299 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

545. (New) A method according to claim 300 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

546. (New) A method according to claim 301 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

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- 547. (New) A method according to claim 302 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.
- 548. (New) A method according to claim 543 wherein said material possesses substantially zero electrical resistance.
- 549. (New) A method according to claim 544 wherein said material possesses substantially zero electrical resistance.
- 550. (New) A method according to claim 545 wherein said material possesses substantially zero electrical resistance.
- 551. (New) A method according to claim 546 wherein said material possesses substantially zero electrical resistance.
- 552. (New) A method according to claim 547 wherein said material possesses substantially zero electrical resistance.
- 553. (New) A method according to claim 298 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.
- 554. (New) A method according to claim 298 wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.
- 555. (New) A method according to claim 554 wherein said material possesses substantially zero electrical resistance.
- 556. (New) A method according to claim 298 wherein said superconducting current is flowing without a source providing for said superconducting current.

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- 557. (New) A method according to any claim 298 further including providing said material.
- 558. (New) A method according to any claim 299 further including providing said material.
- 559. (New) A method according to any claim 300 further including providing said material.
- 560. (New) A method according to any claim 301 further including providing said material.
- 561. (New) A method according to any claim 302 further including providing said material.
- 562. (New) A method according to claim 386 wherein said superconducting current is flowing in a coil comprised of said material.
- 563. (New) A method according to claim 562 wherein said material possesses substantially zero electrical resistance.
- 564. (New) A method according to claim 562 wherein said coil possesses substantially zero electrical resistance.
- 567. (New) A method according to claim 386 wherein said material possesses substantially zero electrical resistance.
- 568. (New) A method according to claim 387 wherein said material possesses substantially zero electrical resistance.

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- 569. (New) A method according to claim 388 wherein said material possesses substantially zero electrical resistance.
- 570. (New) A method according to claim 389 wherein said material possesses substantially zero electrical resistance.
- 571. (New) A method according to claim 386 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance, between said input and said output.
- 572. (New) A method according to claim 571 wherein said material possesses substantially zero electrical resistance.
- 573. (New) A method according claim 386 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.
- 574. (New) A method according claim 387 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.
- 575. (New) A method according claim 388 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.
- 576. (New) A method according claim 389 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.

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- 577. (New) A method according to claim 386 wherein said material possesses substantially zero electrical resistance.
- 578. (New) A method according to claim 387 wherein said material possesses substantially zero electrical resistance.
- 579. (New) A method according to claim 388 wherein said material possesses substantially zero electrical resistance.
- 580. (New) A method according to claim 389 wherein said material possesses substantially zero electrical resistance.
- 581. (New) A method according to claim 386 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.
- 582. (New) A method according to claim 386 wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.
- 583. (New) A method according to claim 582 wherein said material possesses substantially zero electrical resistance.
- 584. (New) A method according to claim 386 wherein said superconducting current is flowing without a source providing for said superconducting current.
- 585. (New) A method according to claim 386 further including forming said material.
- 586. (New) A method according to claim 387 further including forming said material.

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- 587. (New) A method according to claim 388 further including forming said material.
- 588. (New) A method according to claim 389 further including forming said material.
- 589. (New) A method according to claim 391 further including forming said material.
- 590. (New) A method according to claim 459 wherein said superconducting current is capable of flowing in a coil comprised of said material.
- 591. (New) A method according to claim 590 wherein said material possesses substantially zero electrical resistance.
- 592. (New) A method according to claim 590 wherein said coil possesses substantially zero electrical resistance.
- 593. (New) A method according to claim 459 wherein said material possesses substantially zero electrical resistance.
- 594. (New) A method according to claim 460 wherein said material possesses substantially zero electrical resistance.
- 595. (New) A method according to claim 461 wherein said material possesses substantially zero electrical resistance.
- 596. (New) A method according to claim 462 wherein said material possesses substantially zero electrical resistance.

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- 597. (New) A method according to claim 459 wherein said material is part of a circuit element, said circuit element has an input capable of receiving an input current and an output capable of outputting an output current through substantially zero electrical resistance between said input and said output.
- 598. (New) A method according to claim 597 wherein said material possesses substantially zero electrical resistance.
- 599. (New) A method according to claim 459 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.
- 600. (New) A method according to claim 460 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.
- 601. (New) A method according to claim 461 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.
- 602. (New) A method according to claim 462 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be carrying said superconducting current.
- 603. (New) A method according to claim 459 wherein said material possesses substantially zero electrical resistance.
- 604. (New) A method according to claim 460 wherein said material possesses substantially zero electrical resistance.
- 605. (New) A method according to claim 461 wherein said material possesses substantially zero electrical resistance.

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- 606. (New) A method according to claim 462 wherein said material possesses substantially zero electrical resistance.
- 607. (New) A method according to claim 459 wherein said material is part of a circuit element, said circuit element is designed for said circuit element to be capable of carrying said superconducting current.
- 608. (New) A method according to claim 459 wherein said material is part of a circuit element, said circuit element is capable of carrying a superconducting current flowing therein through substantially zero electrical resistance.
- 609. (New) A method according to claim 475 wherein said material possesses substantially zero electrical resistance.
- 610. (New) A method according to claim 459 wherein said superconducting current is capable of flowing without a source providing for said superconducting current.

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